

**WE CLAIM:**

1. A method of managing virtual routing forwarding (VRF) tables at a provider edge PE router of a L3 virtual private network (VPN), said PE router maintaining a VPN-IP master routing information base (RIB) and a sub-RIB for each said VRF table, comprising the steps of:

generating an import route target (ImpRT) tree comprising all ImpRT attributes currently configured on said PE router;

modifying an ImpRTi attribute of a VRFi table;

searching said ImpRT tree for a match to said ImpRTi attribute to identify a VRFm table having said ImpRTi attribute; and

updating said VRFi table accordingly.

2. The method of claim 1, wherein said ImpRT tree maintains a list of all ImpRT attributes at said PE node, each ImpRT attribute being associated with all VRF tables that are currently configured with said ImpRT attribute.

3. The method of claim 1, wherein said step of modifying comprises adding said ImpRTi attribute to said VRFi table.

4. The method of claim 3, wherein said step of updating comprises copying all routes Rm from said VRFm table into said VRFi table, whenever said VRFm table is found in said ImpRT tree.

5. The method of claim 4, further comprising updating said ImpRT tree to include an association between said ImpRTi attribute and said VRFi table.

6. The method of claim 3, wherein said step of updating comprises performing a route refresh whenever said VRFm is not found in said ImpRT tree. a match is not found.

7. The method of claim 4, further comprising:

searching for said route R<sub>m</sub> in a sub-RIB<sub>m</sub> associated with said VRF<sub>m</sub> table; and

copying said routes R<sub>m</sub> from said sub-RIB<sub>m</sub> into said VRF<sub>i</sub> table based on all route target attributes configured for said VRF<sub>i</sub> table, including said added ImpRT<sub>i</sub> attribute.

8. The method of claim 7, further comprising adding said route R<sub>m</sub> to each VRF table in the routing database available at said PE router.

9. The method of claim 2, wherein said step of searching is performed through said master RIB.

10. The method of claim 10, wherein said master RIB includes all routes in all VRF tables at said PE router and further includes all routes that were filtered out at said PE router using ImpRT attributes.

11. The method of claim 1, wherein said step of modifying comprises removing said import route target ImpRT<sub>i</sub> from said VRF<sub>i</sub> table.

12. The method of claim 11, wherein said step of updating comprises parsing all routes in said VRF<sub>i</sub> table and removing all routes from said VRF table that no longer match the remaining import route targets of said VRF<sub>i</sub> table.

13. The method of claim 12, further comprising deleting said routes R<sub>d</sub> from the sub-RIB of said VRF<sub>d</sub>.

14. The method of claim 13, further comprising propagating deleting in said master RIB every route R<sub>d</sub> that no longer matches any ImpRT attribute in said ImpRT tree.

15. The method of claim 1, further comprises maintaining at said PE router a rejected routes tree comprised of routes that were not accepted during the ImpRT filtering, wherein said step of searching is also performed on said rejected routes tree.

16. At a provider edge PE router, a tree data structure comprising for each import route target ImpRT attribute configured on said PE router, a pointer to a virtual routing forwarding VRF table having said respective ImpRT attribute.

17. The tree data structure claimed in claim 15, further providing the association between each said VRF and a respective sub-RIB.

18. A tree data structure stored on a computer-readable medium for enabling modification of virtual routing forwarding (VRF) tables at a PE router, comprising, for each import route target ImpRT attribute configured on said PE router, a pointer to a VRF table with said respective ImpRT attribute.